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ABSTRACT

The computer program MARKTF-M5, written in FORTRAN IV, scores tests (consisting of true-or-false statement about concepts or facts) by comparing the list of true or false values prepared by the instructor with those from the students. The output consists of information to the supervisor about the performance of the students, primarily for his records only, but one page of the output is suitable for posting. The composition of the data deck is designed to facilitate use by those not familiar with programming conventions. The program method, the format of the data, notes on general procedure, and the FORTRAN IV program are discussed. A listing on an IBM 407 of the main program and the subroutine called DECODE, along with a typical set of data, a listing of the package of binary decks with a typical set of data, and typical output of the program are provided. (For related documents, see TM 002 778, 789-791, 793.) (Author/DB)

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TM 002 792

Information on computer programs of the PEDAGE system, for use in scoring and analyzing methods of teaching and examining knowledge of factual material.

MARKTF-M5-F4

December 10, 1965

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University of Toronto
Department of Geology

Computer Program MARKTF-M5

Written in FORTRAN IV source language

For IBJOB compiler, IBSYS monitor, IBM 7094-II computer.

Conforms to current conventions of the Institute of Computer Science, University of Toronto.

Purpose. This program scores tests (consisting of true-or-false statements about concepts or facts) by comparing the list of true or false values prepared by the instructor with those from the students. The output consists of information to the supervisor about the performance of the students, primarily for his records only, but one page of the output is suitable for posting. The composition of the data deck is designed to facilitate use by those not familiar with programming conventions.

Method. The program makes a regression analysis of correctness of all answers (relative to the examiner's control data) and the individual net scores on the test, for each examination statement in turn. The regression slopes for all statements are used as weighting factors in redetermining individual scores, which in turn are used to compute revised regression slopes. This is iterated four times, which was found in development tests to be enough for a steady state. Within each cycle of iteration, the resultant scores are incremented or decremented to bring the mean to a value stated in the data deck, and any scores below zero or over one hundred are made zero or one hundred, respectively.

The final regression slopes for each statement are output, also the final centroid values, and any slopes smaller than -0.333 are listed. The average regression slope is output as a percentage of the ideal value (1.0), and this is a measure of idealness of the set of statements for examination of the class.

The user has the option of combining prior scores from other tests with either 1) the raw scores obtained by using unit weights on each statement or 2) the scores weighted by regression slope factors, to give a current score. Summarizing, he can use this program to obtain information on the efficiency of each examination

statement, to score the students according to his control data and according to the performance of the whole class, and has an option as to which scores are to be combined with prior scores to give current scores.

Data. The format of the data deck is based on the use of 81-place mark-sense cards (FGS system, IBM electrotype 78326), but otherwise it is quite simple.

Using examples, the data deck is made up as follows:

1st card:

```
$DATA
```

2nd card, format (3I6)

```
    54    46     2
```

54 is the number of statements, which may be up to 81; 46 is the number of students, which may be up to 200; 2 is the option selected for combining scores on this test with prior current scores and may be 1 or 2)

3rd card, format (27A1, 6A6, F5.2, F4.1)

```
U Y'U840800Y(UYY84088UYY''8TEST 4,GEOL 116,CHAP.7 AND REVIEW   4.0  60.0
```

(The first 27 characters are the symbols resulting from compressing the 27 columns of triple-row mark-sense data to the left; the next 36 columns contain the title of the test; the next 5 columns contain the number of the test (in real decimal point form) and the next 4 columns contain the desired mean of the scores when the weighted values for each statement are used in computing the scores.)

4th and following cards, format (27A1,6A6,F5.2,F4.1)

```
U YYU44 804Y(UY8(4084UYY"4STEPHENS,J.J., II SOC+PHIL,UC       62.6 5.0
```

(The first 27 columns contain MS data as above; the next 36 columns contain the name and other information of the student; the next 5 columns contain his previous score in the course; the last 4 columns contain any increment or decrement to be added to this test score before combining with the prior score to give a new current score.)

Notes on general procedure. The blank MS cards are punched with the names of the students(starting at column 28 and not extending past column 63) and duplicates are made for all tests of the year. One of these is marked by each student at each examination, and then the supervisor punches in the current prior score into columns 64 to 68 inclusive, and any increment or decrement into columns 69 to 72 inclusive. The MS cards (control card and students cards) are punched by the IBM 519 machine such that the 27 MS marks become punches in the first 27 columns of the card. This deck is duplicated on blank cards by the same machine and added to the data deck after the single control and option card and $DATA card. The data deck is put behind the program deck containing a proper identification first card and then is ready to run.

The MS cards ready for punching the MS data are put face down in the usual position in the PUNCH hopper, with the "Standard MS" control panel in the machine. At least one card should be checked after the run to verify that every pencil mark is represented by an equivalent punch in the same row. If the card with the lightest or thinnest pencil lines gives true punches, there is little chance that any of the others are mispunched. After punching, the MS cards are put in the READ hopper and a stack of blank cards are put in the PUNCH hopper, with the "80/80" control panel in the machine, and a duplicate deck is made. In this step, the MS deck and blank cards should be turned face up. This is to avoid the chance of misreading the punched information when rough cards (due to erasures) are present.

The FORTRAN IV Program

Users normally will obtain a copy of the compiled program in the form of column-binary punched cards but the FORTRAN programs would be required if changes are to be made. All of the arithmetical and statistical manipulations are done in the main program: the subroutine (called DECODE in the program and DECOMS in the binary deck) is only used for the decoding of the triple-row compressed MS coding of 27 columns into lists of 81 T or F characters. A listing on an IBM 407 machine of the two programs, along with a typical set of data, and a listing of the package of binary decks with a typical set of data, are shown below.

Typical output of the program is shown below. The first page contains a list of the names of the students (in the same order as presented in the data deck), and three columns of scores. The first is with unit weights on each statement of the test, the second is with weights on each statement computed from the performance of the students as a group, and the third is a combination of either one or the other of these scores with prior scores to form a current score. The second and third pages list the serial numbers of the statements, the T or F values assigned by the instructor, the computed weighting factors and the computed average values of correctness of the student's answers, assuming that the instructor's T/F values are correct. Miscellaneous further information is given on the third page. A dummy line of output forces the normal termination information to be printed on the fourth page.

The execution time on a 7094-II computer is about one second for each 50 students tested.

```
$JOB  SMITH,F.G.       AP20-4 PEDAGE       2      3     MARKTF-M5-F4
$IBFTC MTF5     DECK
C**PROGRAM MARKTF-M5-F4 **
C**A PART OF THE PEDAGE SYSTEM **
C**SCORES T/F TESTS, CORRECTING FOR VARIATION OF SCORING EFFICIENCY
C  OF EACH STATEMENT.
      DIMENSION TITLE(6), CODE(27),TAN(81),ANS(81),NAME(6,200),
     1 TFSTAT(81,200),CORLO(81),CORHI(81),FAC(81),SCORES(200),
     2 CORAV(81),HOLD(200),NUM(81),CUMPC(200),BONUS(200),COMBIN(200)
      LOGICAL TAN,ANS,OK
      DATA ZERO,ONE,HUND/0.0,1.0,100.0/
      READ(5,12) NSTATS,NSTUDS,NOPT
      RNSTUD=NSTUDS
      RNSTAT=NSTATS
      READ(5,15) CODE,TITLE,XNUM,AVMARK
      WRITE(6,21) TITLE
      OK=.TRUE.
      CALL DECODE(CODE,TAN,OK)
      IF(.NOT.OK) GO TO 1000
      AVER=ZERO
      DO 200 N=1,NSTUDS
      OK=.TRUE.
      READ(5,15) CODE,(NAME(L,N),L=1,6),CUMPC(N),BONUS(N)
      CALL DECODE(CODE,ANS,OK)
      IF(.NOT.OK) WRITE(6,30) (NAME(L,N),L=1,6)
      SCORE=ZERO
      DO 160 K=1,NSTATS
      IF((TAN(K).AND.ANS(K)).OR.(.NOT.TAN(K).AND..NOT.ANS(K))) GO TO 130
      SCORE=SCORE-ONE
      TFSTAT(K,N)=-ONE
      GO TO 160
  130 SCORE=SCORE+ONE
      TFSTAT(K,N)=ONE
  160 CONTINUE
      SCORE=SCORE*HUND/RNSTAT
      AVER=AVER+SCORE
      SCORES(N)=SCORE
      HOLD(N)=SCORE
  200 CONTINUE
      AVER=AVER/RNSTUD
      RAWAV=AVER
      DIF=AVMARK-AVER
      DO 202 N=1,NSTUDS
      SCORES(N)=SCORES(N)+DIF
  202 CONTINUE
      DO 400 ITER=1,4
      AVLO=ZERO
      AVHI=ZERO
      RNLO=ZERO
      RNHI=ZERO
      DO 205 K=1,NSTATS
      CORLO(K)=ZERO
      CORHI(K)=ZERO
  205 CONTINUE
      DO 250 N=1,NSTUDS
      IF(SCORES(N)-AVMARK) 210,210,230
  210 RNLO=RNLO+ONE
      AVLO=AVLO+SCORES(N)
      DO 220 K=1,NSTATS
      CORLO(K)=CORLO(K)+TFSTAT(K,N)
```

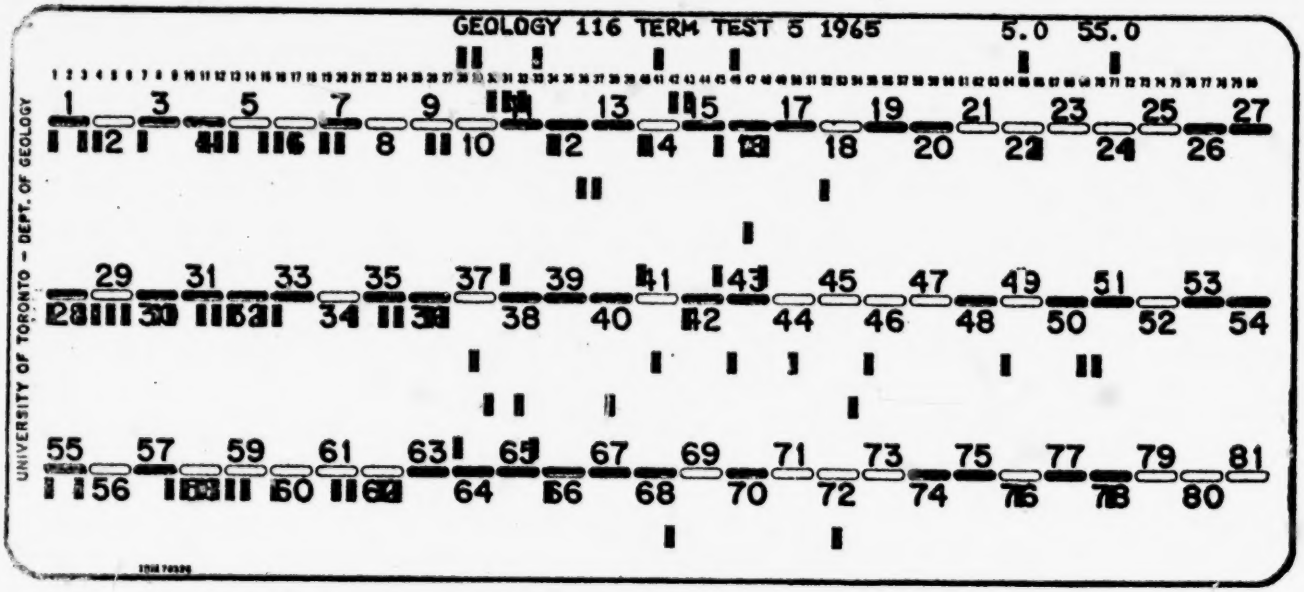
```
  220 CONTINUE
      GO TO 250
  230 RNHI=RNHI+ONE
      AVHI=AVHI+SCORES(N)
      DO 240 K=1,NSTATS
      CORHI(K)=CORHI(K)+TFSTAT(K,N)
  240 CONTINUE
  250 CONTINUE
      AVLO=AVLO/RNLO
      AVHI=AVHI/RNHI
      DIF=AVHI-AVLO
      SUMWT=ZERO
      DO 260 K=1,NSTATS
      CORAV(K)=(CORLO(K)+CORHI(K))/RNSTUD
      CORLO(K)=CORLO(K)/RNLO
      CORHI(K)=CORHI(K)/RNHI
      FAC(K)=HUND/DIF*(CORHI(K)-CORLO(K))
C** FAC(K) IS THE SET OF WEIGHTING FACTORS FOR REVISING THE RAW SCORES**
      SUMWT=SUMWT+ABS(FAC(K))
C**SUMWT IS THE DIVISOR REQUIRED TO NORMALIZE THE SCORES RELATIVE TO 1.0
  260 CONTINUE
      AVER=ZERO
      DO 300 N=1,NSTUDS
      SCORE=ZERO
      DO 280 K=1,NSTATS
      SCORE=SCORE+TFSTAT(K,N)*FAC(K)
  280 CONTINUE
      SCORE=SCORE*HUND/SUMWT
      AVER=AVER+SCORE
      SCORES(N)=SCORE
  300 CONTINUE
      AVER=AVER/RNSTUD
      DIF=AVMARK-AVER
      DO 350 N=1,NSTUDS
      SCORES(N)=SCORES(N)+DIF
  350 CONTINUE
  400 CONTINUE
      CURAV=ZERO
      DO 500 N=1,NSTUDS
      IF(SCORES(N).LT.ZERO) SCORES(N)=ZERO
      IF(SCORES(N).GT.HUND) SCORES(N)=HUND
      GO TO(410,420),NOPT
  410 COMBIN(N)=(HOLD(N)  +BONUS(N)+(XNUM-ONE)*CUMPC(N))/XNUM
      GO TO 425
  420 COMBIN(N)=(SCORES(N)+BONUS(N)+(XNUM-ONE)*CUMPC(N))/XNUM
  425 CURAV=CURAV+COMBIN(N)
  500 CONTINUE
      CURAV=CURAV/RNSTUD
      WRITE(6,41) ((NAME(L,N),L=1,6),HOLD(N),SCORES(N),COMBIN(N),
     1 N=1,NSTUDS)
      WRITE(6,22) RAWAV,AVMARK,CURAV
      WRITE(6,43)
      WRITE(6,42) (K,TAN(K),FAC(K),CORAV(K),K=1,NSTATS)
C**ANALYSIS OF EXAMINERS PERFORMANCE IN SETTING THIS T/F TEST **
      L=ZERO
      SCORE=ZERO
      DO 600 K=1,NSTATS
      SCORE=SCORE+FAC(K)
      IF(FAC(K).GT.(-0.333)) GO TO 600
      L=L+1
```

```
      NUM(L)=K
  600 CONTINUE
      SCORE=SCORE*HUND/RNSTAT
      WRITE(6,51) SCORE,(NUM(K),K=1,L)
      WRITE(6,23)
      STOP
 1000 WRITE(6,32)
      STOP
   12 FORMAT(3I6)
   15 FORMAT(27A1,6A6,F5.2,F4.1)
   21 FORMAT(1H1,9X,6A6 //10X,4HNAME,42X,6HSCORES /46X,7H   RAW ,
     1 9H WEIGHTED,8H CURRENT //)
   22 FORMAT(1H0,9X,7HAVERAGE,30X,3F7.2)
   23 FORMAT(1H1,8X,17HEND OF EXECUTION. )
   30 FORMAT(1H0,9X,31HPUNCHING ERROR IN DATA CARD OF  6A6)
   32 FORMAT(1H0,9X,61HPUNCHING ERROR IN CONTROL DATA CARD. EXECUTION IS
     1 TERMINATED.    )
   41 FORMAT(1H ,9X,6A6,3F7.1)
   42 FORMAT(1H ,9X,I2,L6,2F10.3)
   43 FORMAT(1H1,8X,31HSTAT.  T/F   FACTOR    CENTROID )
   51 FORMAT(1H0,9X,37HT/F EXAMINATION STATEMENTS ARE SCORED
     1 F6.1,19H  PERCENT OF IDEAL.  /
     2 1H0,9X,58HTHE FOLLOWING STATEMENTS WERE INTERPRETED IN REVERSE SE
     3NSE   /
     4 (1H0,9X,20I3))
      END
$IBFTC DECOMS  DECK
      SUBROUTINE DECODE(CODE,B,PUNCH)
      LOGICAL B,PUNCH
      DIMENSION CODE(27),B(81),CHAR(8)
      DATA (CHAR(K),K=1,8)/1H ,1H0,1H4,1H8,1HU,1HY,1H-,1H(/
      DO 17 K=1,27
      IF(CODE(K).NE.CHAR(1)) GO TO 10
      B(K)=.FALSE.
      B(K+27)=.FALSE.
      B(K+54)=.FALSE.
      GO TO 17
   10 IF(CODE(K).NE.CHAR(2)) GO TO 11
      B(K)=.TRUE.
      B(K+27)=.FALSE.
      B(K+54)=.FALSE.
      GO TO 17
   11 IF(CODE(K).NE.CHAR(3)) GO TO 12
      B(K)=.FALSE.
      B(K+27)=.TRUE.
      B(K+54)=.FALSE.
      GO TO 17
   12 IF(CODE(K).NE.CHAR(4)) GO TO 13
      B(K)=.FALSE.
      B(K+27)=.FALSE.
      B(K+54)=.TRUE.
      GO TO 17
   13 IF(CODE(K).NE.CHAR(5)) GO TO 14
      B(K)=.TRUE.
      B(K+27)=.TRUE.
      B(K+54)=.FALSE.
      GO TO 17
   14 IF(CODE(K).NE.CHAR(6)) GO TO 15
      B(K)=.TRUE.
      B(K+27)=.FALSE.
```

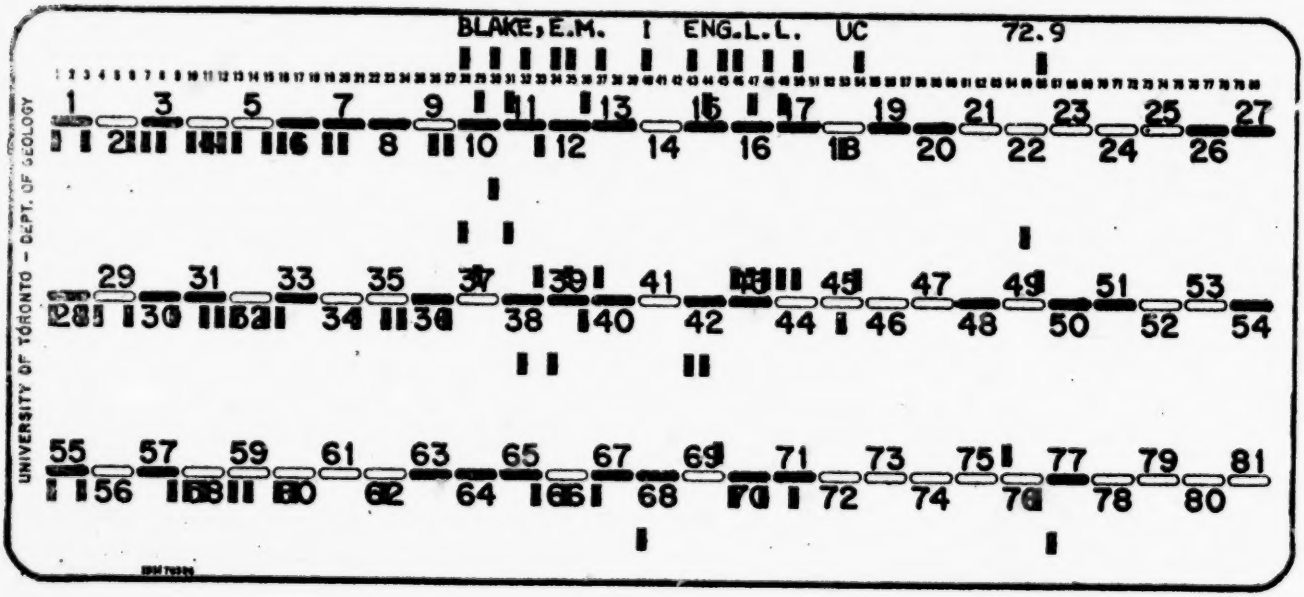
```
      B(K+54)=.TRUE.
      GO TO 17
   15 IF(CODE(K).NE.CHAR(7)) GO TO 16
      B(K)=.FALSE.
      B(K+27)=.TRUE.
      B(K+54)=.TRUE.
      GO TO 17
   16 IF(CODE(K).NE.CHAR(8)) PUNCH=.FALSE.
      B(K)=.TRUE.
      B(K+27)=.TRUE.
      B(K+54)=.TRUE.
   17 CONTINUE
      RETURN
      END
$DATA
    81    29     1
 088804Y4(0-80-Y ((YY(CY UYTERM TEST 4. CH.7 AND REVIEW          4.0  55.0
 088Y04Y4(088U4( (UBY(OY UOBLAKE,E.M.  I  ENG.L.L.  UC          70.4
 U8Y-(4Y4( 804408(U08(U-8UYDAVEY,M.W.R.  I SOC+PHIL NC          55.6
  Y8U04Y4Y08 U(488U8Y( 8 UYDOBLE,RICHARD  I  SOC+PHIL  VIC      53.1
 80-UU-Y (080(U0-YY88(4( (ODUNCAN,R.W.  II  GEN.ARTS  UC        44.8
 YY4Y -Y4(Y8-U40 848Y(U8 U8DUNLEVIE, LINDA  I  SOC+PHIL  UC     53.1
 888(U4Y4(0Y8 4(8-08((UY4(0ELLIS,MISS P.J.  I  SOC+PHIL  VIC   44.0
088-0U-Y4-U88U ( -4 88Y( U8FAYE,GORDON DAVID  I  SOC+PHIL  SMC 59.7
 408(04Y4-UY U-Y8-U8Y(8Y UYGARGER,STEPHANIE ANNE I SOC+PHIL VIC41.6
 8Y8Y -YU-4-804Y YU4U(0( UYGRAHAM,DAVID  I  SOC+PHIL  VIC       55.6
 YY8(04Y4(Y- 0(Y -08((4Y8UYHALLAM,C.B.  I  SOC+PHIL  NC        52.3
 Y88( 4Y4U08-U400808Y(0Y 0(HIBBINS,SUSAN  I  ML+L  UC          58.1
 0Y-U0UY4(0Y-UYY (U-YY Y U8IRVINE,E.P.  I SOC+PHIL  VIC        51.5
 Y08U04Y4(Y-8U-04(UYYYU(8U8KEE,S.E.  I  SOC+PHIL  VIC.         66.3
 YYY8U4Y4(08(Y-0 ((Y8(UY UYKERNIGHAN, PAUL  I  SOC+PHIL  NC    67.1
 8YYY 4Y4UY--0Y00((8-(08 UYJONES,K.G.  I  SOC+PHIL  VIC        51.3
08(8Y048O(4Y -4008Y 8( Y-00KAPUSCINSKI, R.H.J.  I  SOC+PHIL  UC35.8
0 Y-0--Y4(0(-8-Y (88 YU- U LOKESANSZKY,LORAND  I  SOC+PHIL  NC 41.6
 0Y80(4Y4( -8U804(YYY(UYUUYMATHER,V.R.  I  SOC+PHIL  VIC       50.6
  Y8004YU( 8 U--8YU8Y( 8 UYMATTLOSS,D.R.  I  SOC+PHIL  NC      65.4
 Y8YY0(Y4-48-U-Y -08YY0Y8U0PIPHER, J. P.  I  SOC+PHIL  NC      57.2
40Y- U4Y4Y0-804YU(0 8(0( UYRYAN,SHEILA F.  I  SOC+PHIL  SMC    58.1
-8Y( 4-Y040Y-0(8 4U(  ((  YSOLOMON, M. M.  II POL SCI+ECON UC 34.2
48Y8Y -YU-8(80-Y 8(UYYU8 UYSTONE,DAVID B.  I  SOC+PHIL  VIC    53.9
  Y8YU-Y440-80 Y -UY((UY 0YVANDENBERK,DIDI  I  SOC+PHIL  VIC   60.5
4YY(4U4Y4U48-( 00(( 8(U84UYWAIN, M.  II  MOD. HIST.  VIC       42.4
 YY8 4-Y4(Y- UUY8(08Y(0Y4UYWESTLAKE,SHARON LYNNE I SOC+PHIL NC 43.2
4U88Y0-Y4(Y88U(Y (U8Y(UY8U8WYLIE,LYNDA MARION  I  SOC+PHIL  NC 65.4
  Y-004Y4-088O4Y (U Y(UY UYYOUNG, ELIZABETH K.  I  SOC+PHIL VIC58.9
08Y((04(4UOYY4-Y8-U Y((--U8SZALAY, DARLENE  II  GEN.ARTS  VIC  42.0

   226*CARDS
```

```
$IBLDR MTF5                                                    11/25/65    MTF50000
$TEXT  MTF5                                                    11/25/65    MTF50001
*N .((S77-7V*7 5 -07,   07(P  07W*- 07(  9        9  -  - 7  W (*(  -    MTF50002
*N9P(*Q7V*7V*7     - 9- 9Z(XY----*,(-7PPZZ,*-7*3*7))X-((*(PP-(XP(PXPPP$X*MTF50003
*N8(XZ*7V*7V*7 ((PWXP(*P*XPZ0,*7****6*--7PZZW*-(G*P***()PZ0,*=(*P(P*(X(PMTF50004
*N9,Z(*7V*7V*7 *P*X*P**XZ0,*9(*P(P*(X(*)*)P*P*XX***(G(**))**PPPZX,*----7MTF50005
*N7-()*7V*7V*7 ZX,*,(--3,XPZZW*±(**P*PP**)PP*)(XPPPZ0,*-(***))*)***))P*PMTF50006
*N-(X)*7V*7V*7 *)PPPPPPP*--=X***)*PX*)PPPPPPPPPPPPPPPPPPPPPPO,*7((*))*)***MTF50007
*N-$((*7V*7V*7 ))P*(*)*)*P*G(*(P*)PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP7-(,-MTF50008
*N-((X*((*X(*X-7XP   74007(-/9 9- 7U7-+97(7-+97(7-+97X7-047(- 6,8+990490MTF50009
*N6*((*7(*X(*7-- 669097(47(- 6,8+990480- 669097(   74007(-/- 9- 7(   74+MTF50010
*N=CXX*7(*7(*( 07(-/-  - 7(   74+07(-/-  9 7(7-+97(7-+97T7-0   74007(-/6MTF50011
*N=*()*X(*7(*7- 90 7(   74-07,-/=  9 7(7--47(97(   74007(-/=  -  - 7(77(MTF50012
*N=*PP*7(*7(*( 57(57*47,97,-7((X(G7(-7((X(G7(G6957,-7,47(97(   74007X-/-MTF50013
*N7**X*X(*-X*7- 9- 7(   74+07(-/-  - 7(77,7XX74 YX(77XG597-+95 (X((X(7-+MTF50014
*N-XP(*7(*7(*P-97X7-+97G7-0   74007,-/-  -  - 7(77(57X   74007,-/7 90 7(MTF50015
*N-**9*7V*7(*P-77,7XX74 YX(77(G5945 7-+(X((X(7--47,97(77,7X(74 XG(77(77XMTF50016
*N-(,**7(*7(*7-G59G5-57(75-57(75-57(75-57(57X47(=7(97(=7(95 57(47(67(97(MTF50017
*N5XW**7(*7(*7-47(95 (X(07(77(77W77(E7(47,67(97,47(97*47(97((X(07U47,77(MTF50018
*N-(GX*7(*7(*7-E7,47,97,47T=7,97,-7((X,G7VG6947,67*97*(XV07X-7((X(G7(-7(MTF50019
*N-X(U*7(*7(*7-(X(G7(-7((X(G7(-7((XXG7X-7((X(G7$-7((X(G7*-7((X(G7*-7((XXMTF50020
*N-P()*7(*7(*7-G7*G6957,-7,47,97X47,97(47,97(47,97(G5947,97*47,97P(X(07(MTF50021
*N7-(**7(*7(*P G5957,-7,47*=7T37,77X47(67(97(47X67*97X77,7X(74 XGX77(G79MTF50022
*N--((*7(*7(*7 47 67*97*(X(07(57(47(67(97(47(67*97(77,7X(74 XG(77XG7947 MTF50023
*N-((X*7(*7(*7-67P97P(XX07X(X(07(47X77(E7X47(77(E7(47(=7X97,47,97XG5947*MTF50024
*N-Z(-*7(*7(*7-67P77(E7(47*77(E7*47P77(E7P47P=7*97(47W77,77(97*47*97(47(MTF50025
*N7P((*7(*7(*7 7 967X97X(X$07(47,97,G5957,-7,47,97(77,7X(74 XG*77*G7977 MTF50026
*N-((-*7(*7(*7-77*67(97((X*07*77(77W77XE7(47,67(97,47(97*(X*07N47,77(E7,MTF50027
*N-()P*7(*7(*7-47T=7,97,G5947,67*97*(X*07*(X*(X(47,97(-7((XPG7*G6947*87,MTF50028
*N-(((*7(*7(*7-37P77P47,97*47*87W37$G7$47W97*74-74 -7X(X*-7*57*57*47(=7(MTF50029
*N7(I7*7(*7(*7--  77X67G67(77(E7G57*47(=7(-  77X67G67*77(E7G47(67G97((X*MTF50030
*N-(X(*7(*7X*7 07*47(77(E7(   74007*-/7 90 7(-7((X*G7*G6957,-7,77,7XX74 MTF50031
*N-XG**7(*7(*X-YX*77*G5945 7-+(X*(X*47(7-+47*7-+47G7-+(X*07P7--   74007*MTF50032
*N-**X*7(*XX*X--/- 90 7X47,7-+47T7-+47(7-+7--   74007*-/- 90 7(7--   740MTF50033
*N4(K**X(*7(*7-07*-/- 90 7(-7((X*G7*G6957(-7(47(7-+46-7-+47*7-+47(7-+(X*MTF50034
*N-((7*7(*7(*7-07P7--47,F8-) 6- 6E7X47,97(-7((X*G7*G6957(-7(47(67*97(47*MTF50035
*N-*(7*7(*7(*7+17(37*G7*57*47X17(97X77X(X$77P47(9  (X*07P77(77W77(E7(   MTF50036
*N-*(X*P(*7(*X-74007P-/- 90 7(47(7+-7X(XPG7*G6947(7-+(X*07*7--   74007PMTF50037
*N7*)X*7*PX(*7--/- 90 7(7--47(   7- 07*-/-   74007*-/- 90 7(7--47(   7- MTF50038
*N-(((*7X*7V*X 07*-/--7*   7-007P-/- 7(   )*P07*77 75 76 74 -7*G- 549   MTF50039
*V-(D**X(*7    77*7- G9 77P77Q77R77J77*7 -57X 7*                        MTF50040
$CDICT MTF5                                                    11/25/65    MTF50041
*N (((7P* 1-)*P7L ((( 7*(X*-6 (*(-6 (**-6 (*)-6 ***-6 (**-6 (*)-6 XD--   MTF50042
*N9((X(()-  (**-  XD--  (*)-  *7P-  *7P-  *7P-  *7P-  *,P-  *,P-  *,P-   MTF50043
*58X(-*XP-  *(P-  P*)-                                                   MTF50044
$DKEND MTF5                                                    11/25/65    MTF50045
$IBLDR DECOMS                                                            DECO0000
$TEXT  DECOMS                                                            DECO0001
*N G(-=7*=7V*2-0 70 70 -0 -0 -- 6- 90 -0 70 -PPP7PP7PPXPPPPPXPPXPPXPPO 7DECO0002
*N9()**7V*7X*7-G6946 8 -3 -5 -56 56 56 5 746 8 -3 -5 -)6 56 56 5 746 8 -DECO0003
*N8-G.*7X*7(*7 3 -5 -56 )6 56 5 746 8 73 -5 -56 56 )6 5 746 8 -3 -5 -)6 DECO0004
*N9()-*7(*7(*7-)6 56 5 746 8 -3 -5 -)6 56 )6 5 746 8 -3 95 -56 )6 )6 5 7DECO0005
*N7X()*7V*XV*7-46 8 73 =5  )6 )6 )6 (XZ(G-5 R0  0 -76 74 - -G40549   7 -DECO0006
*N-*)P*7V*7(*7-740G 074-74876944976 (XZ76-76-76-76-76-76-76-76-44776 (XZDECO0007
*N--*,*7(*X(*7-76-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ76-DECO0008
*N-(*)*X(*7(*X-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ76-0WZ76-0WZ76-(WZ7690WZDECO0009
*M6,X(*7(*6V-7 7690WZ769(WZ76=0WZ76=0WZ76=44-- 60 -      0 -   **)       DECO0010
$CDICT DECOMS                                                            DECO0011
*0 (X(8/  1-**)8/ ***   P*)-                                             DECO0012
$DKEND DECOMS                                                            DECO0013
```

Addenda. A typical MS card, marked by the supervisor, punched, and ready for duplication, is shown below.



A typical MS card, marked by a student taking the test, punched, and ready for duplication, is shown below.



TERM TEST 4. CH.7 AND REVIEW

NAME	SCORES RAW	COR	CUR
BLAKE,E.M. I ENG.L.L. UC	80.7	83.1	73.6
DAVEY,M.W.R. I SOC+PHIL NC	48.1	24.6	47.8
DOBLE,RICHARD I SOC+PHIL VIC	50.6	52.3	52.9
DUNCAN,B.W. II GEN.ARTS UC	25.9	6.9	35.3
DUNLEVIE, LINDA I SOC+PHIL UC	48.1	49.3	52.1
ELLIS,MISS P.J. I SOC+PHIL VIC	50.6	35.9	42.0
FAYE,GORDON DAVID I SOC+PHIL SMC	35.8	19.5	49.7
GARGER,STEPHANIE ANNE I SOC+PHIL VIC	55.6	65.7	47.6
GRAHAM,DAVID I SOC+PHIL VIC	53.1	78.7	61.4
HALLAM,C.B. I SOC+PHIL NC	63.0	88.1	61.3
HIBBINS,SUSAN I ML+L UC	55.6	66.5	60.7
IRVINE,E.P. I SOC+PHIL VIC	55.6	73.7	56.9
KEE,S.F. I SOC+PHIL VIC.	60.5	77.9	69.2
KERNIGHAN, PAUL I SOC+PHIL NC	72.8	56.4	64.4
JONES,K.G. I SOC+PHIL VIC	58.0	75.0	64.7
KAPUSCINSKI, R.H.J. I SOC+PHIL UC	23.5	11.5	29.7
LOKESANSZKY,LORAND I SOC+PHIL NC	38.3	13.9	34.7
MATHER,V.R. I SOC+PHIL VIC	65.4	79.5	57.8
MATTLESS,D.R. I SOC+PHIL NC	58.0	65.9	65.5
PIPHER, J. P. I SOC+PHIL NC	55.6	75.7	61.7
RYAN,SHEILA F. I SOC+PHIL SMC	63.0	64.9	59.8
SOLOMON, M. M. II POL.SCI+ECON UC	16.0	17.8	30.1
STONE,DAVID A. I SOC+PHIL VIC	53.1	72.5	58.5
VANDENBERK,DIDI I SOC+PHIL VIC	65.4	81.2	65.7
WAIN, M. II MOD. HIST. VIC	38.3	20.6	36.9
WESTLAKE,SHARON LYNNE I SOC+PHIL NC	60.5	74.2	51.0
WYLIE,LYNDA MARION I SOC+PHIL NC	67.9	87.2	70.9
YOUNG, ELIZABETH K. I SOC+PHIL VIC	70.4	72.1	62.2
SZALAY, MARLENE II GEN.ARTS VIC	33.3	5.4	32.9
AVERAGE	52.49	55.00	53.67

STAT.	T/F	FACTOR	CENTROID
1	F	1.430	0.259
2	T	1.331	-0.012
3	F	-0.199	-0.185
4	F	0.775	0.185
5	F	-0.417	-0.210
6	T	-0.020	0.160
7	F	-0.437	0.309
8	T	0.357	0.333
9	F	0.060	0.235
10	T	-0.596	0.160
11	T	-0.020	0.160
12	F	1.132	0.160
13	F	0.854	0.259
14	T	1.787	0.235
15	F	-0.020	0.160
16	T	0.497	0.284
17	F	0.060	0.235
18	T	1.192	0.037
19	T	1.072	0.284
20	T	0.377	-0.185
21	T	1.847	0.111
22	T	0.715	0.309
23	T	0.199	0.185
24	T	1.490	0.136
25	F	-0.218	0.333
26	T	0.357	0.333
27	T	0.775	0.185
28	F	0.060	0.235
29	F	-0.079	0.284
30	F	0.357	0.333
31	F	1.847	0.111
32	F	1.053	0.086
33	F	1.410	0.062
34	T	0.000	0.358
35	F	0.357	0.333
36	T	1.072	0.284
37	T	0.139	0.309
38	F	0.417	0.210
39	T	1.609	-0.111
40	F	0.338	0.136
41	F	0.675	-0.086
42	T	-0.159	0.210
43	F	0.636	0.235
44	F	-0.298	0.259
45	T	0.556	0.160
46	T	0.119	0.111
47	F	-0.298	0.259
48	F	-0.516	0.235
49	T	0.199	0.185
50	F	1.112	-0.037
51	F	1.490	0.136
52	F	0.993	0.210
53	T	0.278	0.259
54	F	-0.218	0.333
55	F	0.357	0.333
56	F	0.894	-0.062
57	T	-0.079	0.284
58	T	0.357	0.333
59	T	0.616	0.037

60	F	0.497	0.284
61	F	0.477	0.086
62	T	0.000	0.358
63	F	0.000	0.358
64	T	0.417	0.210
65	F	-0.953	0.185
66	T	0.000	0.358
67	T	0.556	0.160
68	F	1.212	0.235
69	T	0.973	0.012
70	T	1.053	0.086
71	F	1.132	0.160
72	T	0.357	0.333
73	T	-0.556	-0.160
74	T	0.914	0.136
75	T	0.497	0.284
76	T	0.357	0.333
77	F	0.854	0.259
78	T	0.000	0.358
79	F	0.199	0.185
80	F	0.715	0.309
81	T	0.993	0.210

T/F EXAMINATION STATEMENTS ARE SCORED 48.6 PERCENT OF IDEAL.

THE FOLLOWING STATEMENTS WERE INTERPRETED IN REVERSE SENSE

5 7 10 48 65 73

GEOLOGY 116, TERM 1, TEST 4, CHAPTER 7 AND REVIEW. NOV 11, 1965.

THE FOLLOWING STATEMENTS ARE TO BE JUDGED TRUE OR FALSE BUT NOT BOTH.

1 THE PERMEABILITY OF SHALE IS GREATER THAN THE PERMEABILITY OF UNCEMENTED SANDSTONE.

2 THE VOLUME OF GRANITE WOULD INCREASE DURING CHEMICAL WEATHERING IF THE PRODUCTS OF WEATHERING WERE NOT REMOVED.

3 VERTICAL FAULTS USUALLY HAVE VERTICAL DISPLACEMENTS.

4 MOST OF THE COMPOSITE VOLCANIC PEAKS ARE MADE OF BASALT.

5 FLINT IS A SILICATE MINERAL FOUND IN SOME KINDS OF SEDIMENTARY ROCKS.

6 SOME OF THE MINERALS OF METAMORPHIC ROCKS CONTAIN WATER.

7 ALL SEDIMENTARY ROCKS ARE COMPOSED OF CLASTIC FRAGMENTS.

8 SOME BEDS OF TUFF ARE KNOWN TO HAVE BEEN DEPOSITED IN WATER.

9 METAMORPHISM OF ALL OF THE COMMON TYPES OF SEDIMENTARY ROCKS CHANGES THEIR ORIGINAL MINERAL ASSEMBLAGES TO NEW ASSEMBLAGES.

10 SOME EXTRUSIVE IGNEOUS ROCKS HAVE A PORPHYRITIC TEXTURE.

11 AN ANTICLINE IS A FOLD THAT OPENS DOWNWARD AND CLOSES UPWARD.

12 SANDSTONE IS RELATED TO QUARTZITE IN THE SAME SENSE AS MARBLE IS RELATED TO LIMESTONE.

13 TUFF IS A SEDIMENT COMPOSED OF FINE-GRAINED GLASSY METEORITE FRAGMENTS.

14 MOST OF THE SCHISTOSE METAMORPHIC ROCKS CONTAIN MICA AS A MAJOR MINERAL CONSTITUENT.

15 DOLOMITE IS LESS SOLUBLE THAN SANDSTONE IN AVERAGE GROUND WATER.

16 SLICKENSIDE SURFACES FORM ONE CLASS OF FAULT SURFACES.

17 THE CRYSTALS OF MICA IN MICA SCHISTS ARE GENERALLY SMALLER THAN THOSE IN SLATES.

18 THE ROCK NAME ,,BRECCIA,, IMPLIES THAT THE CONSTITUENT FRAGMENTS OF THE ROCK ARE ANGULAR.

19 VOLCANIC ASH BEDS HAVE BEEN FOUND HUNDREDS OF MILES FROM ANY POSSIBLE VOLCANIC SOURCE.

20 MUSCOVITE CONTAINS POTASSIUM AS AN ESSENTIAL COMPONENT.

21 VITRIC TUFF AND WELDED TUFF ARE SYNONYMOUS TERMS SPECIFYING A KIND OF EXTRUSIVE ROCK.

22 THE STEEP TYPE OF VOLCANIC CONE USUALLY CONTAINS BEDS OF TUFF, ASH, CINDERS, OR BOMBS, AS WELL AS LAVA FLOWS.

23 LIMONITE IS A HYDROUS IRON OXIDE.

24 WATER IS SOLUBLE TO AN APPRECIABLE EXTENT IN MAGMA.

25 ALL FAULTS ARE JOINTS.

26 CARBON DIOXIDE IN WATER INCREASES THE SOLUBILITY OF CALCITE.

27 MOST OF THE IGNEOUS ROCKS ARE AGGREGATES OF CRYSTALLINE MINERALS.

28 MAGNETITE IS A MAJOR MINERAL COMPONENT OF GRANITE.

29 IN GROUND WATER OF AVERAGE COMPOSITION, QUARTZ IS MORE SOLUBLE THAN CALCITE.

30 GRABENS ARE A TYPE OF NODULE IN LIMESTONE.

31 BY DEFINITION, MAGMA IS A ROCK NAME.

32 SOME OF THE MAJOR CLAY MINERALS CONTAIN CARBON DIOXIDE AS AN ESSENTIAL COMPONENT.

33 THE AVERAGE GRAIN SIZE OF THE CONSTITUENT MINERALS OF LIMESTONE IS LARGER THAN THAT OF MARBLE.

34 SOME MINERALS ARE RADIOACTIVE.

35 CROSS-BEDDING IN SANDSTONE IS DUE TO FOLDING AFTER SEDIMENTATION.

36 GNEISSIC OR GNEISSOSE SPECIFIES A KIND OF MINERAL TEXTURE IN ROCKS.

37 THE TERM WEATHERING USUALLY INCLUDES PHYSICAL AS WELL AS CHEMICAL BREAKDOWN OF ROCKS AT THE SURFACE.

38 RHYOLITE IS A FERROMAGNESIAN MINERAL.

39 IN UNFAULTED ROCKS, ANTICLINES NEVER OCCUR WITHOUT ACCOMPANYING SYNCLINES.

40 SLATEY CLEAVAGE USUALLY IS NEARLY PERPENDICULAR TO THE AXIAL PLANE OF FOLDING.

41 SERICITE IS CLASSED AS A METAMORPHIC ROCK.

42 SHALE IS RELATED TO MUD AS SANDSTONE IS TO SAND.

43 THE TERM ,,GEOSYNCLINE,, IS USED TO INDICATE A RELATIVELY SMALL SYNCLINE.

44 THE SAN ANDREAS FAULT IS A NORMAL FAULT.

45 THE CLAY MINERALS AS A CLASS CONTAIN ALUMINIUM.

46 SOME MICAS ARE CLASSED AS FERROMAGNESIAN MINERALS.

47 WATER IS THE ONLY KNOWN LIQUID THAT HAS A BOILING TEMPERATURE AT ATMOSPHERIC PRESSURE.

48 ALL TYPES OF FAULTS PRODUCE FAULT SCARPS.

49 MASSIVE SANDSTONE BEDS SOMETIMES CONTAIN JOINTS.

50 THE ROCK NAME ,,BRECCIA,, IMPLIES THAT THE ROCK IS COMPOSED OF VOLCANIC FRAGMENTS.

51 GEOSYNCLINES ARE CROSS-SECTIONAL DIAGRAMS OF EARTH STRUCTURES.

52 A BATHOLITH IS A LARGE BODY OF ROCK FORMED BY A LAVA FLOW.

53 THERE ARE SOME CHLORIDE MINERALS.

54 ROCK WEATHERING IS DEFINED AS THE TOTAL OF ALL THE DIFFERENT KINDS OF CHEMICAL ALTERATIONS AT THE SURFACE.

55 FUJIYAMA(FUJISAN) IN JAPAN IS AN EXAMPLE OF A SHIELD VOLCANO.

56 PORPHYRITIC TEXTURE IS FOUND IN BATHOLITHIC INTRUSIVES MORE COMMONLY THAN IN ANY OF THE EXTRUSIVE ROCKS.

57 TUFF CAN BE CLASSED WITH SEDIMENTARY ROCKS AS WELL AS WITH IGNEOUS ROCKS.

58 THE TERM SOIL IS USED IN MORE THAN ONE WAY.

59 BY DEFINITION, LAVA IS NOT A ROCK NAME.

60 SLATE IS A SEDIMENTARY, RATHER THAN METAMORPHIC, ROCK TERM.

61 THE DENSITY OF RHYOLITE IS GREATER THAN THAT OF BASALT.

62 THE COLOR OF SOME SANDSTONES IS DUE TO IRON OXIDE DEPOSITED ON THE GRAINS.

63 SCARPS ARE ANGULAR FRAGMENTS OF VOLCANIC GLASS.

64 THE VOLUME OF 1 GRAM OF ICE IS LARGER THAN THE VOLUME OF 1 GRAM OF WATER, AT ATMOSPHERIC PRESSURE.

65 ATMOSPHERIC CARBON DIOXIDE IS AN INACTIVE CHEMICAL AGENT IN THE CHEMICAL WEATHERING OF ROCKS.

66 REEF SEDIMENTS ARE COMPOSED PRINCIPALLY OF CALCIUM CARBONATE.

67 PERIDOTITE HAS A GREATER DENSITY THAN BASALT.

68 THE SURFACE OF RHYOLITIC LAVA FLOWS GENERALLY IS SMOOTHER THAN THE SURFACE OF BASALTIC LAVA FLOWS.

69 GRABENS ARE TOPOGRAPHICAL EXPRESSIONS OF PARALLEL FAULT SCARPS.

70 AGGLOMERATE IS RELATED TO TUFF AS CONGLOMERATE IS TO SAND.

71 PEGMATITE IS A VITREOUS(I.E. GLASSY) IGNEOUS ROCK.

72 OIL AND GAS SOMETIMES ARE FOUND IN BURIED CORAL REEFS.

73 AGGLOMERATE IS RELATED TO TUFF AS CONGLOMERATE IS TO SILT OR TO SILTSTONE.

74 SLATEY CLEAVAGE OF SEDIMENTS USUALLY IS NOT PARALLEL TO THE BEDDING PLANES.

75 MAUNA LOA IN HAWAII IS AN EXAMPLE OF A SHIELD VOLCANO.

76 PUMICE IS A VESICULAR IGNEOUS ROCK.

77 QUARTZITE IS RELATED TO QUARTZ AS LIMESTONE IS TO DOLOMITE.

78 ORTHOCLASE IS A FELDSPAR MINERAL.

79 SHALES OFTEN CONTAIN SOME COBBLES.

80 SALINE SOILS DEVELOP IN THE TROPICAL RAIN FORESTS.

81 SERICITE IS A KIND OF WHITE OR COLORLESS MICA.